



m/021/004

January 13, 1994

Mr. Wayne Hedberg  
State of Utah  
Department of Natural Resources  
Division of Oil, Gas, and Minerals  
355 West North Temple  
3 Triad Center, Suite 350  
Salt Lake City, UT 84180-1203



JAN 18 1994

DIVISION OF  
OIL, GAS & MINING

**RE: Escalante Tailings Impoundment Reclamation Plan, Revision 2**

Dear Mr. Hedberg:

I am enclosing a Draft Second Revision of the Reclamation Plan incorporating all the changes to the January 2, 1992 Plan that have been previously discussed through correspondence between Hecla and the State. The text of the plan includes references to sources of modifications to the earlier Plan. With the exception of the change in impoundment runoff ditch slopes, there are no changes to the plan that have not been discussed and accepted by both Hecla and the State.

Hecla would like to start work on this project in March. It is important to have a response from the State as soon as possible so we can finalize our Request for Proposal and get the bid process started. I appreciate your assistance in finalizing this process. Give me a call if you have any questions.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Alan Wilson".

Alan Wilson  
Senior Reclamation Engineer

enclosures

cc: George Wilhelm, HMC (w/o enclosures)  
Don Ostler, Utah DWQ  
Gina Pack, BLM

# **DRAFT**

**HECLA MINING COMPANY**

**RECLAMATION PLAN**

**ESCALANTE UNIT  
MILL TAILINGS FACILITY**

**Revision 2  
January 13, 1993**

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## **1.0 INTRODUCTION**

This document is submitted to incorporate the previously agreed to modifications to the reclamation plan submitted by Hecla dated January 2, 1992. This plan includes a ten inch layer of waste rock to replace the six inch clay cap layer. As stated in a November 1, 1993 letter to UDOGM, Hecla will to the extent practicable, select coarse rock with a diameter of 0.5 inch and larger. This specification was approved by UDOGM in a December 1 1993 letter to Hecla. The subsoil layer thickness has been increased from 14 to 18 inches. This is the thickness stipulated in the December 1, 1993 letter from UDOGM to Hecla.

The side slopes of the impoundment runoff ditch have been increased from 4H:1V to 3H:1V to minimize the area of disturbance on the south side of the pond. The natural slope of the land is greater than 4H:1V so there would have been an extensive amount of stripping necessary to install the ditch with the 4H:1V slope. The width of the ditch bottom has been increased from 8 to 9.5 feet to maintain the 1.5 foot water depth at the maximum flow rate. The riprap specifications for the ditch included in the March 17, 1993 letter from Hecla to UDOGM have been included in this document.

## **2.0 LAND USE**

The tailings impoundment is located on U.S. Bureau of Land Management (BLM) land. Adjacent parcels of land are owned by the BLM, as well as Hecla. The pre-operational use of this land included occasional grazing, mining and exploration activities, and wildlife habitat. The probable land uses during the post Escalante mining stage will be occasional grazing, minerals exploration and mining activities, and wildlife habitat. There should be no difficulty in returning the disturbed area to a condition capable of supporting these types of land uses.

## **3.0 PUBLIC SAFETY AND WELFARE**

To effectively reclaim the tailings impoundment, some fences may need to be dismantled temporarily. However, there will be sufficient signs to warn the public during the earth moving stage. Because future uncontrolled livestock grazing could damage revegetation efforts, the existing fence will be modified, after implementation of revegetation measures, to prevent grazing by domestic stock. The fence will be modified to allow safe passage for wildlife, while restricting usage by livestock.

## **4.0 SLOPES**

The downstream slope of the embankment containing the tailings is stable at its present 2 horizontal to 1 vertical slope ratio. Revegetation results from past seeding (1980) on the embankment are successful. This revegetation will suffice in preventing wind erosion. Water erosion will be controlled by preventing surface water flow from crossing the embankment. The tailings cap will be sloped gently (0.25% to 0.5%) away from the tailings embankment.

This shallow slope will result in a low runoff velocity without causing ponding, which will reduce the likelihood of erosion of the cover material.

The new impoundment runoff ditch will also be sloped gently (about 0.2%) in the longitudinal direction to preclude erosion. The side slopes of the ditch will also be constructed to prevent erosion. After construction the impoundment runoff ditches will be seeded with the mix for borrow areas specified by the BLM for borrow areas. Mulch will be applied to stabilize the bottom and sides of the ditch until vegetation becomes established.

## **5.0 GROUNDWATER MONITORING SYSTEM**

The ground-water monitoring system is comprised of four wells (TMW-1, TMW-2, TMW-3, TMW-4). Two of these wells, TMW-1 and TMW-3, are upslope and west of the tailings area. The other wells, TMW-2 and TMW-4, are downslope of the tailings dam, to the east of the tailings area. TMW-2 and TMW-4 are also downgradient of the tailings area, while the other two wells are upgradient.

Hecla and DEQ agreed on the terms of a groundwater monitoring program which was formalized in a Consent Decree signed on February 5, 1993. Hecla will continue to conduct water quality sampling at the four wells in accordance with the Consent Decree signed with Utah Department of Environmental Quality.

## **6.0 DRAINAGES**

Hecla will recontour the tailings area through the use of waste rock, subsoil, and topsoil to assure the area is left in a stable condition. The recontouring will involve completely filling the tailings impoundment area such that no water will be ponded on the site. Stormwater runoff will be directed around the site and into the natural channel below the tailings dam without affecting the face of the original containment structure. Storm events or runoff occurring in the basin above the tailings containment area will be diverted via the existing basin interceptor trench and newly constructed impoundment runoff ditch constructed around both sides of the impoundment. This will assure that surface water flow is not channeled across the reclaimed surface and the face of the impoundment structure. Any storm events or runoff originating on the tailings cap will be diverted off the cap to the new impoundment runoff ditch. The runoff conveyances are designed for the 100-yr, 6-hr flood event. These structures will channel storm water to the natural water course below the tailings. Considering the size of this small arid basin (with no visible gullies or watercourses), the basin will be left in a stable condition that will avoid future damage to the hydrologic system.

The longitudinal slope of the tailings cap will range from approximately 0.25% to 0.5%. Based upon a 100-yr, 6-hr design storm, the new impoundment runoff ditch will have a longitudinal slope of approximately 0.2% (0.002 ft/ft), a trapezoidal cross-section with side slopes of 3 to 1, and a bottom width of 9.5 ft, as shown in Detail 2, Drawing No. 11358A. The 2.5-foot deep ditch, which includes 1-foot of freeboard, is designed to carry a discharge of 68 cubic feet per

second. The approximate location of the ditch is shown on Drawing No. 11357A. The exact location of the ditch will depend on the location and depth of borrow areas.

The ditches will be lined with riprap in the area of the dam abutments and the hillslopes leading to the natural channel below the dam. The riprap specifications required to withstand erosion resulting from the 100-year runoff were developed by Grant, Schreiber, and Associates and included in a letter from Hecla to UDOGM dated March 17, 1993. The specifications are:

- Impoundment ditches: Mean diameter of at least 0.6 inches and a layer thickness of at least 12 inches.
- North abutment hillslope: Mean diameter of 2.25 feet and a layer thickness of 3.375 feet.
- South abutment hillslope: Mean diameter of 2 feet and a layer thickness of 3 feet.

If any of the subsoil borrow areas are located where the current basin interceptor trench lies, a new basin interceptor trench will be re-established on grade after the borrowing process is complete.

## **7.0 STRUCTURES AND EQUIPMENT**

Hecla proposes to temporarily dismantle some fencing around the impoundment to facilitate construction of the impoundment cover. Because future uncontrolled livestock grazing could damage revegetation efforts, the existing fence will be modified after implementation of revegetation measures to restrict grazing. The fence will be modified to allow safe passage for wildlife, while restricting usage by livestock.

Hecla will abandon and close the ground-water monitoring wells when monitoring is no longer required, in accordance with the State of Utah well closure rules in effect at the time of closure.

## **8.0 SEDIMENT CONTROL**

Sediment caused by erosion from stormwater runoff will be controlled by revegetating the tailings cap, revegetating all borrow areas, and placing water bars in the access and haulage roads to the tailings facility. The revegetation mixture is presented in Section 9.1. The Checkett topsoil used on the tailings cap will provide a naturally gravelly surface condition and will provide an adequate erosional armorment for stormwater runoff.

## **9.0 RECLAMATION/REVEGETATION**

The reclamation/revegetation activities for this project are divided into four different reclamation prescriptions for the four different types of disturbances.

### **9.1 Tailing Impoundment Reclamation**

The reclamation objectives for the 65-acre tailings impoundment are three-fold. First, a capillary barrier will be constructed to impede the upward migration of moisture and minimize any upward translocation of available salts or metals. Second, a self-sustaining vegetative cover must be established to protect against wind and water erosion. Third, infiltration of water into the tailings is prevented through runoff control and evapotranspiration. After reclamation has been completed the tailings underdrain will be capped and sealed.

Generally, the reclamation prescription proposed to meet these objectives consists of compacting the existing tailings surface as is possible, placing a 10-inch capillary barrier of waste rock, 18 inches of subsoil, 6 inches of topsoil, application of hay, seedbed preparation, seeding, vegetation establishment, and maintenance. The total depth of material placed on the tailings will be a minimum of 34 inches.

The tailings surface will first be compacted with at least three passes with a padded foot, or other appropriate compaction equipment, as approved by UDOGM in a December 1, 1993 letter to Hecla. This will should aid in the reduction of permeability of the surface layer and provide a more stable working surface.

The 6 inches of topsoil and 18 inches of subsoil will provide a minimum rooting medium of 24 inches over the impoundment. As an additional measure to assure establishment of vegetation, DOGM suggested the addition of hay to the subsoil and to the topsoil layer above the subsoil at a rate of two to three thousand pounds per acre. It is proposed to add the hay at this rate in order to increase nitrogen, increase moisture holding capacity, minimize any re-seeding or maintenance activities, and to decrease the number of years needed to carry reclamation bonds.

The six inches of topsoil will be placed on top of the subsoil and drill seeded after the hay has been applied. Hecla proposes to seed the area with shallow rooted grasses and forbs. Shrubs will not be seeded on the impoundment cover because they are deep rooting plants. Hecla proposes to use the seed mix recommended for the tailings impoundment by DOGM in a letter to Hecla dated April 29, 1991, with the exception that alfalfa will be omitted from the suggested mixture because it is a deep rooting plant. In general, the following seed mix will be used on the impoundment cover. Hecla reserves the right to adjust the quantity of each type of seed, depending upon seed availability and concurrence with DOGM:

+ BLM

Species	lb/acre PLS*
<u>Grasses</u>	
Bottlebrush squirrel tail	0.5
Needle and thread	0.5
Crested wheatgrass	1.0
Riparian wheatgrass	2.0
Western wheatgrass	2.0
Indian ricegrass	2.0
Russian wildrye	1.0
<u>Forbs</u>	
Lewis flax	0.5
Palmer penstemon	1.0
Yellow sweetclover	2.0
Gooseberry & or Goldenmallow	1.0
Small burnet	<u>1.0</u>
Total	14.5

\* Based upon drill seeding only. The rates will be increased <sup>if</sup> seeds are broadcast.

Expectations are that shallow-rooted grasses will establish and dominate. Because of the difficulty of rangeland seeding in Checkett soils, follow-up grass seedings will be conducted as needed.

## 9.2 Subsoil Borrow Area Reclamation

The two subsoil borrow areas are located adjacent to the tailing impoundment, as shown on Drawing No. 11357A. The combined source area totals approximately 31 acres. Approximately 25% of the subsoil required will come from the impoundment diversion ditch construction with the remainder from the outlined area.

A typical subsoil extraction procedure would be as follows:

1. Push the topsoil off the subsoil layer with the use of a dozer.
2. Excavate and transport the material to the tailings impoundment.
3. Replace the topsoil over the borrow area.
4. Reseed the disturbed borrow area.

Some borrow sources that have deep deposits will result in deeper excavations. In those cases, the cut slopes will be graded back to at least a two to one or flatter slope that will blend in with the natural topography. The topsoil removed from the borrow areas to expose the subsoil material will be replaced. As requested by DOGM, hay will be incorporated into the topsoil at a rate of approximately 2,000 to 3,000 pounds per acre.

For borrow areas on BLM land the seed mixture recommended in BLM's letter dated December 16, 1991, approving the Plan of Operations, will be used for seeding of disturbed areas. Hecla reserves the right to adjust quantities depending on seed availability and pre-approval of changes by the authorized BLM officer. This seed mixture is as follows:

<b>SPECIES</b>	<b>lb/acre PLS</b>	<b>Method</b>
Bottlebrush squirreltail*	2.0	Drill
Needle-and-thread*	2.0	Drill
Crested wheatgrass (Nordan, Fairway, Ephraim, Hycrest)	1.5	Drill
Pubescent wheatgrass (Luna)	2.0	Drill
Yellow sweetclover	1.0	Broadcast
Alfalfa (Ladak, Nomad, Spreader II)	1.0	Broadcast
Common globemallow*	0.5	Drill
Small burnet	1.0	Drill
Wyoming big sagebrush*	0.5	Drill
Black sagebrush*	0.5	Drill
Fourwing saltbush*	1.0	Drill
Forage kochia	0.5	Broadcast
Curlygrass (Galleta)	3.0	Drill
Palmer penstemon	<u>1.0</u>	Broadcast
Total	17.5	

As requested by the BLM, broadcast seeding will be completed before drilling to provide a minimal soil cover over the broadcast seed. Seeding will be completed in the fall immediately following the reclamation to decrease the encroachment of introduced annual weed species into the area. Hecla will install and maintain fences around the reclaimed areas to prevent damage to the seedlings from wild horses and livestock grazing. The fences will be removed after Hecla and the BLM agree that the areas are stable enough for the resumption of grazing. The fences will consist of 4 wires and will not exceed 40 inches in height. The top three wires will be barbed and the bottom wire will be smooth. The wire spacing from the ground to the top will be 16 inches, 6 inches, 6 inches, and 12 inches respectively.

To ensure vegetative recovery at least 8 to 10 inches of topsoil/subsoil, as is available, will be left covering the white, high-pH soil material that underlies the subsoil material. The base material will be ripped before replacing the topsoil.

For disturbed areas on Hecla-owned land, the Utah Department of Wildlife's suggested seed mixture will be used dependent on seed availability and other agency agreement. That seed mix is described below:

<b>SPECIES</b>	<b>lb/acre PLS</b>
Bottlebrush squirreltail*	0.5
Needle-and-thread*	0.5
Crested wheatgrass (Nordan, Fairway, Ephraim, Hycrest)	1.5
Pubescent wheatgrass (Luna)	1.0
Russian wildrye	1.0
Lewis flax	0.5
Palmer penstemon	0.5
Yellow sweetclover	1.0
Alfalfa (Ladak, Nomad, Spreader II)	1.0
Common globemallow*	0.5
Small burnet	1.0
Winterfat	1.0
Wyoming big sagebrush*	0.5
Black sagebrush*	0.5
Green and white rubber rabbitbrush	1.0
Low rabbitbrush	0.5
Fourwing saltbush*	1.0
Forage kochia	<u>0.5</u>
Total	14.0

Seeding on Hecla-owned land will be completed during the late fall or early winter months. Grasses, forbs, and some shrubs will be drill seeded. Other shrubs will have to be hand seeded after ripping the soil. Grasses will be seeded in rows different from the shrub and forb seed to prevent over competition of the grasses.

### **9.3 Topsoil Storage Area Reclamation**

The topsoil storage area will be reclaimed in the same manner as the subsoil borrow sources on BLM land. Some topsoil from the stockpile may be allocated for use in this area.

### **9.4 Access Road Reclamation**

A new access road will need to be established to haul topsoil materials to the tailings site. The amount of new road establishment disturbance is expected to total less than 1 acre. Efforts will be made to place the road where little or no cut and fill is necessary. After reclamation is complete, the newly established road will be ripped, water-barred, topsoiled, and seeded. The seed mix and methods for the road will be similar to the prescription described for the subsoil borrow areas.

As approved in the Plan of Operations submitted to the BLM, the existing access roads (mill to tailings impoundment) will be reduced to a one-lane road. Disturbed areas adjacent to the one-

lane road will also be ripped and seeded with the mixture described in Section 10.2. This road will be needed for periodic tailings reclamation inspections and general land management use. Hecla will leave this road in a condition suitable for continued use, complete with existing drainage structures.

#### **10.0 CLOSURE SCHEDULE**

If weather permits and required approvals are received, earth moving activity would start in March 1994. The following tentative schedule outlines the reclamation process:

<b>ACTIVITY</b>	<b>ANTICIPATED DATE</b>
Begin Earth Moving	3/1/94
Complete Earth Moving	8/1/94
Seed	10/1/94
Cap and Grout Underdrain	11/1/94
Bond Release	2/1/95